Novel biofiltre for the treatment of volatile organic compounds (VOCs) emitted by the wood panel industry

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ABSTRACT. The technological platform developed in joint partnership by Forintek Canada Corp. and CO_2 Solution Inc. for which a patent has been filed, consists of a close integrated unit of a biofiltre made of bark and an enzymatic bioreactor. The technology tested at the Forintek laboratory in Ste-Foy, Québec, allows to oxidize the volatiles organic compounds (VOCs) in a biofiltration unit made with 100% bark as a media, and then trapping the carbon dioxide (CO_2) in the enzymatic reactor to produce an inert solid (bicarbonate). Laboratory tests have been conducted with the primary VOC emitted by the panel industry like methanol, formaldehyde, alpha-pinene and hexanal and preliminary results have confirmed the high efficiency of the laboratory unit. The first phase of the unit consists of a biofiltre inoculated with specific fungi selected for the degradation of the specific compound and also able to colonize coniferous bark species. The carbon dioxide produced by the oxidation of the VOCs in the biofiltre is sent into the enzymatic bioreactor which is composed of a matrix supporting an enzyme capable of transforming the carbon dioxide into carbonate ions. A solvent is sprayed from the top of the enzymatic reactor at counter flow to the air to trap the ions that are sent in a precipitation unit. This novel technology has been created to treat wood panel industry's VOCs but may be adapted to any other sectors where biofiltration is used. The degradation of the VOCs and the capture of the carbon dioxide will not only help industry to comply with local regulation but also with the international Kyoto protocol.